U. S. DEPARTMENT OF AGRICULTURE,

BUREAU OF SOILS—MILTON WHITNEY, Chief.

IN COOPERATION WITH THE TENNESSEE GEOLOGICAL SURVEY.
WILBUR A. NELSON, STATE GEOLOGIST.

SOIL SURVEY OF MEIGS COUNTY, TENNESSEE.

BY

A. T. SWEET, IN CHARGE, AND J. H. AGEE.

W. EDWARD HEARN, INSPECTOR, SOUTHERN DIVISION.

[Advance Sheets—Field Operations of the Bureau of Soils, 1919.]

WASHINGTON:
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1921.

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LETTER OF TRANSMITTAL.

U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS,
Washington, D. C., November 24, 1920.

SIR: Under the cooperative agreement with the Tennessee Geological Survey, Wilbur A Nelson, State geologist, a soil survey of Meigs County was carried to completion during the field season of 1919.

I have the honor to transmit herewith the manuscript and map covering this work and to recommend their publication as advance sheets of Field Operations of the Bureau of Soils for 1919, as authorized by law.

Respectfully,

MILTON WHITNEY,
Chief of Bureau.

Hon. E. T. MEREDITH,
Secretary of Agriculture.

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SOIL SURVEY OF MEIGS COUNTY, TENNESSEE.

By A. T. SWEET, In Charge, and J. H. AGEE.—Area Inspected by W. EDWARD HEARN.

DESCRIPTION OF THE AREA.

Meigs County is situated in eastern Tennessee, approximately 25 miles northeast of Chattanooga and 50 miles southwest of Knoxville. It is separated by one county from the State of Georgia on the south and by two from North Carolina on the east. The Tennessee River forms its entire northwestern boundary. The county is about 35 miles in length and averages only about 5½ miles in width. It has an area of 211 square miles, or 135,040 acres.

Meigs County occupies a part of the Great Appalachian Valley, which has a general northeast-southwest trend. It slopes gently toward the southwest and in this latitude has an average elevation of about 800 feet above sea level. The valley floor is broken by a series of long, narrow, nearly parallel ridges which rise to a height of 200 to 300 feet above the valley proper, and between which are long narrow valleys, having the same general trend as the Great Valley. Within the small valleys and in places cutting through the ridges are numerous streams, the largest of which have cut channels considerably lower than the main valley floors. The Tennessee and Hiwassee Rivers have cut their channels and lower flood plains nearly 100 feet lower than the general level of the valley, thus giving a difference in elevation between these lower valleys and the crest of the ridges of approximately 400 feet.

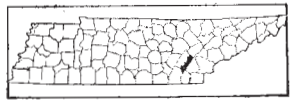


FIG. 1.—Sketch map showing location of the Meigs County area, Tennessee.

McMinn Ridge, which forms much of the eastern boundary of the county, is sharp and narrow, with a general elevation above sea level of over 1,000 feet. Numerous knobs along the crest of this ridge rise slightly higher. To the west of the ridge extends a long narrow valley, which, although continuous, is traversed by numerous streams, the different parts of the valley taking the name of the stream that drains it. Thus, the extreme northern part of this valley, which is drained by Dry Creek, is known as Dry Creek Valley. This stream empties into Big Suee Creek, which in turn follows the valley a distance of about 5 miles then turns abruptly to

the right and passes out. A short distance farther south Little Suee Creek crosses the valley practically at right angles, draining a small part of it through small lateral tributaries. From Little Suee to Goodfield Creek no large stream enters or crosses the valley, which is here known as No Pone Valley. Farther south tributaries of Goodfield Creek extend into the valley, one flowing north or up the valley and the other south or down the valley. The lower part of this valley in Meigs County is drained by Pierce Creek into the Hiwassee River. West of this valley a ridge, or rather a series of ridges, separates it from the main valley of the county, the upper part of which, known as Tenmile Valley, is drained by Tenmile and Suee Creeks, the central part by Dry and Goodfield Creeks, and the southern part by Agency Creek. South of the Hiwassee River the same valley is drained by Gunstocker Creek.

Another example of a long continuous valley drained by different streams, and known under different names, is Tenmile Valley, which in its extreme northern part is divided by Tenmile Ridge into Tenmile Valley proper and Hurricane Valley. West of this main valley is a broad cherty ridge sometimes referred to as the River Ridges. This ridge has a maximum elevation of about 1,000 feet. It has the same general northeast-southwest trend as the other ridges and valleys and in places rises abruptly from the Tennessee River flood plain. In other places where the river makes large meanders fragments of other valleys and ridges remain. Such remnants of ridges are to be found extending north from Peakland, at Hunter Bluff, and at Garrison Bluff. There are numerous other secondary ridges and valleys. Of the former the Texas Knobs are the most prominent. These lie near the county boundary about 2 miles south of Russell Ferry. This is a short semicircular ridge, several knobs in which rise to an elevation of more than 1,200 feet.

The topography of the valleys ranges from undulating to rolling in the lower areas, but as the ridges are approached the slopes become steeper. Where the higher ridges are covered with chert they do not erode so badly as the other ridges, and, although steep, they generally are tilled. The chert ridges in many places contain sinks and small coves having no surface outlet, and drainage is mainly subterranean. Near the Tennessee and Hiwassee Rivers there are in many places well-defined terraces which are fragments of old flood plains, formed before the rivers had cut their channels to their present levels. They lie at elevations of 40 to 80 feet above the river channels and in places are quite level, but in many places they have been badly eroded. Numerous small tributary streams also cut through them, breaking their continuity. Below these high terraces there are lower terraces, subject to overflow during very high stages of the streams. These lower terraces rise 20 to 40 feet above the

river at its normal stage. They are highest along the river or outer edge and slope gradually away from it. Small streams or drainage ditches usually mark their outer edge. Similar terraces have been developed along the larger creeks within the area, but to a less marked extent.

According to the topographic sheets[1] of the United States Geological Survey the highest point in the county is near the end of Tenmile Ridge, about 1½ miles northeast of Tenmile, where an elevation of more than 1,300 feet is reached. Points on the Texas Knobs have an elevation exceeding 1,200 feet, and on McMinn Ridge many points have an elevation of more than 1,100 feet. The ridge immediately east of Decatur, that between Tenmile and Euchee, the ridge west of Bigspring, and the other higher ridges have an elevation of 1,000 feet. The flood plains of the Hiwassee River and of the Tennessee from Fochee Island southward have an elevation of less than 700 feet. Tenmile Valley, Goodfield Valley, Agency Creek Valley, and Gunstocker Valley, all of which lie in the same lowland belt, have an elevation of approximately 800 feet. The main valleys therefore lie at an elevation of approximately 100 feet above the large stream flood plains and from 200 to over 300 feet below the crests of the higher ridges.

The Tennessee River, with its main feeders, Hiwassee River and Suee and Goodfield Creeks, forms the drainage outlet for the entire county. The Hiwassee River crosses the southern part of the county. Its largest tributaries are Agency and Gunstocker Creeks. Both the Tennessee and Hiwassee are navigable by steamboats. Among the smaller streams are Tenmile, Little Suee, Davis, and Black Ankle and Hurricane Creeks. The creeks and branches and their numerous smaller tributaries reach into every part of the county.

The relation between the drainage and the topography of Meigs County presents a very interesting study. The topography is characterized by long narrow, high parallel ridges and corresponding long, narrow intervening valleys. Both ridges and valleys have the same trend and a very gradual slope to the southwest. The ridges are continuous except where they have been intersected by streams, and the valleys contain no obstructions such as transverse rocky ridges. A drainage system developing naturally in a region of this kind usually consists of long, nearly straight streams following the trough of the valleys, with numerous short tributaries entering at right angles and draining the adjacent ridges, but a study of the streams of Meigs County shows almost the reverse of this arrangement. Suee Creek crosses McMinn Ridge 2 miles southeast of Tenmile, follows Suee Valley a little more than 3 miles, and then turns abruptly across Hurricane Ridge. It then follows Tenmile Valley

[1] See Geol. Folios Nos. 4, 6, and 20, U. S. Geol. Survey.

4 miles and again turns southwest, crossing the high chert ridge west of this valley. Little Suee likewise crosses McMinn Ridge and Hurricane Ridge. Hiwassee River flows directly across three ridges and two low belts within Meigs County. Likewise the Tennessee River, with its wide, swinging meanders, crosses and recrosses ridges and low belts alike. The small tributaries of these streams usually follow the valleys. There is thus developed in this region a drainage system in striking contrast to that which might be expected in a region having its existing surface relief. This may be due to any one of a number of causes which need not be discussed here. It is evident that if this county had had its present main surface relief at the time the streams established themselves they would have adopted different courses from those they now have. The existing relief is the product of recent erosion effected since the drainage system was established.

There are numerous large perennial springs throughout the county, many of which supply water for domestic use.

Several flour mills in the county are run by water power, and additional power might be developed for light plants or for manufacturing purposes.

Meigs County was organized in 1836, the early settlers coming principally from other parts of the State and from adjacent States. The population is almost exclusively native-born American. In 1920 the county had a population of 6,077, all of which was rural. Settlement is not uniformly distributed, the valleys, especially the limestone valleys, being more densely populated than the ridges, in which the inhabitants are scattered. The shale and sandstone ridges are also less densely populated than the chert ridges.

Decatur, the county seat, had in 1910 a population of only 165, and its population according to the 1920 census is 142. Other villages are Tenmile, Bigspring, Brittsville, and Georgetown, each having one to four stores, a blacksmith shop, church, school, and a few dwellings.

Meigs County has no railroad within its boundaries. Spring City and Dayton, on the west side of the Tennessee River, and Sweetwater, Athens, and Cleveland, on the east side, are the principal railroad points from which supplies are brought into the county. Mail service to Decatur is from Athens, to the northern part of the county from Sweetwater, and to the southern part from Dayton. Considerable work has been done on the public roads of the county and a few fairly good cross-country roads have been built. A good road traversing the county from end to end seems to be greatly needed. Much freight is shipped by boats, which afford semiweekly service on the Tennessee and Hiwassee Rivers. Chattanooga and Knoxville are the principal markets for the products of the county.

CLIMATE.

The climate of Meigs County is well suited to the type of agriculture carried on. The mean annual rainfall of 56.2 inches, recorded by the Weather Bureau station at Decatur, is rather uniformly distributed throughout the year. March is the month of heaviest rainfall, the mean for this month being 6.39 inches. Fall is the season of least rainfall, the average being about 10 inches; the average for the other seasons is approximately 15 inches. Corn, and to some extent other crops, sometimes suffer slightly from drought during late spring and early summer. This is especially true when torrential spring rains pack the ground and are followed by periods of slight or no rainfall. Excessive late summer and early fall rains also frequently cause heavy losses by flooding bottom lands along the rivers and smaller streams.

The temperature of Meigs County is equable, the mean temperature for the year being 58.9° F., for the spring 59°, and for the fall 60°. The mean winter temperature is 39.9° and that for summer 76.5°. Extremes ranging from 20° below zero to 104° F. have been recorded, but such temperatures are very unusual.

The average date of the last killing frost in spring is April 18 and of the first in the fall October 23, giving a growing season of 188 days. The date of the latest recorded killing frost in the spring is May 10 and of the earliest in the fall October 10.

The following table gives the more important climatic data as recorded by the Weather Bureau station at Decatur:

Normal monthly, seasonal, and annual temperature and precipitation at Decatur.

[Elevation, 850 feet.]

Month.	Temperature.			Precipitation.			
	Mean.	Absolute maximum.	Absolute minimum.	Mean.	Total amount for the driest year (1904).	Total amount for the wettest year (1903).	Snow, average depth.
	°F.	°F.	°F.	*Inches.*	*Inches.*	*Inches.*	*Inches.*
December	39.7	72	− 3	5.86	5.40	2.68	1.1
January	40.0	76	− 9	4.48	3.16	3.83	1.7
February	40.1	75	−20	5.39	3.28	15.11	3.1
Winter	39.9	76	−20	15.73	11.84	21.62	5.9
March	50.8	91	2	6.39	7.10	12.12	0.6
April	58.1	89	21	5.14	2.07	6.58	T.
May	68.0	96	30	4.17	4.77	4.43	0.0
Spring	59.0	96	2	15.70	13.94	23.13	0.6

Normal monthly, seasonal, and annual temperature and precipitation at Decatur—Continued.

[Elevation, 850 feet.]

Month.	Temperature.			Precipitation.			
	Mean.	Absolute maximum.	Absolute minimum.	Mean.	Total amount for the driest year (1904).	Total amount for the wettest year (1903).	Snow, average depth.
	°F.	°F.	°F.	Inches.	Inches.	Inches.	Inches.
June	74.7	100	40	4.94	2.59	6.58	0.0
July	77.6	104	51	5.25	2.56	5.50	0.0
August	77.1	101	52	4.44	2.29	5.43	0.0
Summer	76.5	104	40	14.63	7.44	17.51	0.0
September	71.6	100	34	3.55	2.31	0.18	0.0
October	60.0	96	19	3.27	0.05	4.10	T.
November	48.4	82	11	3.32	4.09	4.12	0.6
Fall	60.0	100	11	10.14	6.45	8.40	0.6
Year	58.9	104	−20	56.20	39.67	70.66	7.1

AGRICULTURE.

The agriculture of Meigs County consists of general farming and stock raising. The principal crops are corn, wheat, hay, oats, cowpeas, soy beans, cotton, and tobacco. The only special crop of importance is strawberries.

According to the report of the United States Census for 1920, there were 16,916 acres in corn, producing 372,545 bushels, or an average of 22 bushels per acre. The first bottoms of the Tennessee and Hiwassee Rivers are recognized as the best corn lands. Here corn is planted year after year, and yields of 25 to 60 bushels per acre are obtained. The terraces or second bottoms are also used to a considerable extent for corn, but the yield is not so good as on the first bottoms. Next to the first bottom land the limestone valleys are used most extensively for corn, and good yields obtained. The shale valleys, although not very productive, have been under cultivation for many years, corn being one of the principal crops. The chert ridges were regarded by the early settlers as practically worthless for cultivated crops, but during recent years considerable areas have been cleared and put under cultivation. On these corn is grown to some extent, and yields considerably better than those of the shale valleys are obtained. Corn is the principal cash crop of the river-bottom farms. It is shelled, sacked, and shipped, usually to Chattanooga or Knoxville, by boat. In the remainder of the county corn

is the most important of the subsistence crops. It is grown on every farm and used for feed for work stock, to some extent for fattening hogs and cattle, and for meal, hominy, and grits for home use.

Wheat has been grown in Meigs County to a small extent for many years, and to a greater extent during the last few years, owing to the stimulus of higher prices. In 1920 there were 3,327 acres in wheat, yielding 25,962 bushels, or an average of only 7.8 bushels per acre. A large part of the wheat grown is consumed within the county.

Oats, both winter and spring varieties, are grown to only a very small extent in Meigs County. The winter oats, if sown early, usually prove the more productive; they are, however, frequently injured by severe cold and for this reason are not so well suited to this region as to one of milder winter climate.

Grass crops both for hay and for pasturage are important. In the river bottoms and in the limestone valleys clover, or clover and timothy or redtop mixed is an important cash and subsistence crop. Along the rivers it is stored in large hay barns and later baled and shipped to market; in the valleys it is used largely to feed cattle and work animals. Herd's grass, or redtop, is used extensively for pasturage and for hay. Cowpeas and soy beans, which are grown to a considerable extent, are planted either in the rows of late planted corn or between the rows later and used for pasturage, or they may be sowed broadcast or sowed in rows alone and cultivated. During the last few years soy beans have rapidly increased in popularity as a hay and forage crop and are now grown on most of the farms in the county.

Millet is another crop of importance. It is either sown with cowpeas or alone and used as hay, or it is cut and thrashed for the seed, which on some farms is a rather important cash crop.

Cotton has been grown in Meigs County for many years, but the acreage has never been large. Stimulated by high prices the acreage at present is larger than it has been for many years, the 1920 census reporting 1,476 acres with a production of 535 bales. The growing of cotton is confined almost exclusively to the southern part of the county. Here the method of soil preparation and cultivation seems rather indifferent. Only a small amount of fertilizer is used, the seed bed is often not well prepared, the stand is irregular, and the rows are not kept free from weeds and grass. Kings, Trice, Half and Half, and other small-boll, quick maturing varieties are grown.

Tobacco has been grown since the county was first settled. At various times the crop has been grown extensively for market, but at present it is grown principally for home use. The 1920 census reports 25 acres in tobacco with a production of 18,884 pounds. White Burley is the leading variety.

Strawberries have been grown for market rather extensively during the last few years, the 1920 census reporting 434 acres with a production of 530,131 quarts. Tomatoes are grown in a small way for a cannery near Decatur. Potatoes, sweet potatoes, melons, and other vegetables and fruits are grown for home use on almost every farm, but only in a very small way as a cash crop.

Except on the river bottom farms, where corn and hay are the principal cash crops, the principal income of the farms of the county is derived from live stock. Cattle are the most important live-stock interest. In the northern part of the county there are several fine herds of registered Aberdeen Angus. In the central and southern parts Herefords and Shorthorns seem to be more popular. There are a few dairy cattle, principally Jerseys, throughout the county, but no dairy herds.

There is much open range in Meigs County, but owing to the enactment of a stock law this can not be used, and the raising of all live stock has been somewhat restricted. This is especially true on farms operated by tenants, since there is rarely any provision for the keeping of live stock other than work animals. Hogs and sheep are raised throughout the county, but not extensively, only a few being kept on any one farm.

According to the 1920 census there were in Meigs County 6,535 cattle valued at $231,167; 702 sheep and goats valued at $6,060; and 4,380 swine, valued at $50,167. The poultry products for the same year had a value of $105,755. Poultry raising, however, is handicapped somewhat by the ravages of foxes, which are numerous and are protected by law.

In Meigs County the soils and topography have a noticeable influence on the cropping systems. River and stream bottom soils, where well drained, and the better soils of the limestone valleys produce clover and give good yields of corn, wheat, and other crops. Soils of the chert ridges produce clover and fair yields of other crops, though only a small proportion of their area is under cultivation. Soils of the shale valleys and ridges produce no clover and give only small yields of other crops. The shale ridges are too steep for profitable cultivation, and, when cultivated, they suffer seriously from erosion. They are valued at present principally for the timber they produce and to a small extent as pasture land. Farmers in general recognize these influences of soil and topography and adjust their crops accordingly.

In breaking the land and preparing the seed bed two-horse and three-horse plows and in some cases tractors are used. Two-horse cultivators are used mainly on the larger farms, but much one-horse and hand work is also done, especially in growing strawberries, cotton, and tobacco.

The better equipped farms as a whole are found in Tenmile Valley and its extension; that is, in the limestone valleys. Here the farm buildings, including the dwellings, are generally large and substantial; the fences are very good; and there is an abundance of good work stock and up-to-date farm implements. Many of these farms are well stocked with cattle, hogs, sheep, and poultry. On the river-bottom farms similar conditions frequently prevail; much of this land, however, is farmed by tenants and, as a whole, the improvements are not so good as in the limestone valleys. In the shale valleys the farms are usually smaller and not so well improved or equipped as are those of the limestone valleys. Where the chert ridges are under cultivation the improvement and equipment is often very poor, consisting of a log cabin, a small shed for a barn, poor fencing, and little stock.

The farmers of this region usually follow a four or five year rotation consisting of corn one or two years, followed by either wheat or oats, and this by clover for one or two years. Manure is applied to the ground before plowing for corn, and commercial fertilizer, if used, is applied with the wheat. Difficulty in securing a stand of clover often disarranges this rotation, and many farmers are now using soy beans, following the small grains.

Some farmers grow one, two, or three crops of corn and then put the land into grass, which is pastured for two or more years. The river-bottom lands and some of the low-lying creek bottoms which are subject to annual overflow are used for corn year after year.

In 1919 there was spent for fertilizers on 465 farms (the total number reporting) $14,929, or $32.10 per farm. The amount of fertilizer used is very small, light applications of from 75 to 150 pounds per acre of an 8–2–2 [2] mixture being made on cotton and wheat.

Laborers are scarce and much of the work is done by the farmer and his family. Most of the laborers are native whites, but a small amount of negro labor is used.

Farms range in size from 40 to 500 acres or more. In 1920 the average size was 133.2 acres, of which approximately one-half was classed as improved land, including pasture and grass land. At least one-half the land is nonproductive, or practically so. The merchantable timber has been removed, but the land has not been cleared for use as pasture.

Nearly 55 per cent of the farms are operated by the owners and the rest by tenants.

Rentals for the bottom lands are one-half the corn, delivered, the tenant furnishing teams, seed, and feed.

Land values vary widely. The better grades of river-bottom land range from $150 to over $200 per acre, with little for sale even at

[2] Percentages, respectively, of phosphoric acid, nitrogen, and potash.

these prices. In the limestone valleys the prices range from $20 to $50 for land with poor improvements to $75 where the improvements are good. In the shale valleys the price ranges from $5 to $25, depending upon improvements and location. On the chert ridges the price of unimproved land is $10 to $20 an acre, but where improved, and especially where used for strawberries, prices are often much higher, small tracts frequently selling for $50 an acre.

SOILS.

The soils of Meigs County are divided into two classes—residual soils and alluvial soils. The residual soils are derived from the weathering of the underlying rock, while the alluvial soils consist of material brought down by the streams and deposited in the flood plains. The residual soils, which constitute by far the greater part, or all of the upland area of the county, are derived from limestones, shales, and sandstones, all the surface rock formations being sedimentary.

The indurated or bed rocks[3] of Meigs County consist of shales, sandstones, and limestones, all of great age, occurring in a series of alternating, rather narrow, northeast and southeast belts.

Extending through the center of the county in a northeast-southwest direction, and having a width of 1½ to 2½ miles, and also in a narrow ridge along the eastern border of the county from the Hiwassee River north lie belts of cherty magnesian limestone known as the Knox dolomite. On account of the resistance to erosion given to this formation by the abundant and very resistant chert which it contains, both these belts consist of ridges. The chert occurs as nodules and thin beds in the limestone and as the latter weathers through the solution of the carbonates, either of lime or of lime and magnesia, the material other than the carbonates is left behind. The fine-grained material existing as impurities in the rock is left as silt and clay, while the chert is left as gravel and stone varying considerably in size, giving a clay with many gravel and stones scattered through it.

Between these two ridges lies a lowland belt underlain by another limestone, but in this case one that contains no chert. It is known as the Chickamauga limestone. Upon weathering into soil material it leaves a fine grained mass of silt and clay, free from chert fragments. Outcrops occur at Tenmile, Moores Chapel, Decatur, and Bigspring. Lying to the east of this limestone valley is a series of long narrow sandstone ridges which attain considerable height above the valley floor and are locally known as Tenmile Ridge, Hurricane

[3] Data from the Kingston, Chattanooga, and Cleveland geological folios, U. S. Geological Survey.

Ridge, and Texas Knobs. The sandstone is gray to reddish brown or purple in color, is quite hard, and includes an occasional bed of white quartzite. The rocks in these ridges constitute what are known as the Rockwood and Rome formations. Immediately east of the sandstone ridges lies the almost unbroken No Pone Valley in which the underlying formation is shale. It lies considerably lower than the dolomite ridge forming the eastern boundary of the county and the sandstone formation on the west of it. It is a typical shale valley. To the west of the big dolomite ridge and lying in close proximity to the Tennessee River are areas of the same and similar shale. These areas are particularly noticeable to the northeast of Euchee and to the west of Calico. Northeast of Tenmile are small bodies of Athens shale.

The weathering and decomposition of these rocks give soils which differ in color, structure, texture, drainage conditions, topography, and productivity. These soils are grouped into series and further divided into soil types, the unit of classification.

The Hagerstown series has brown surface soils and light-brown to reddish-brown compact but friable subsoils. It is derived in Meigs County from the Chickamauga limestone and in places modified by material from the Knox dolomite. Two types, the Hagerstown silt loam and gravelly loam, were mapped.

The Decatur series includes types characterized by reddish-brown to deep-red surface soils and intensely red stiff subsoils. These soils owe their origin to the weathering of pure limestone. Only one type, the Decatur clay loam, occurs in the county.

The types in the Colbert series have gray to yellowish-gray or light-brown surface soils and yellow, tough and plastic subsoils. They are derived from pure limestone. The Colbert silty clay loam and silt loam were mapped.

The types included in the Frederick series have gray to yellowish-gray surface soils, the subsoils passing from pink in the upper part through deep yellow to reddish yellow and becoming at about 15 to 24 inches a rather stiff light-red clay. The soils in this series come from the Knox dolomite or cherty limestone, and a large quantity of flint or chert appears on the surface. Only one type, the Frederick gravelly loam, was mapped.

The Dekalb series includes types with gray, yellowish-gray, to light-brown surface soils and yellow to brownish-yellow friable subsoils. These soils are derived from the weathering of sandstones and shales, in this area from the Rome and Rockwood formations and Conesauga shale. The Dekalb silt loam and stony loam are developed.

In the Montevallo series are included types with light-brown to gray or slightly mottled surface soils, and prevailingly mottled purp-

lish-yellow and gray stiff and compact subsoils. The disintegrated shale comes near the surface in many places. Only one type, the silty clay loam, is mapped.

Along the Tennessee and Hiwassee Rivers and larger creeks are developed first bottoms, second bottoms, and older terraces. These older terraces have undergone considerable erosion since deposition and have lost practically all of their former terrace topography. The material composing these terraces and bottom lands was brought down and deposited by the streams on their flood plains. The soils derived from this material are classed in the Waynesboro, Holston, Elk, Huntington, and Atkins series.

The soils in the Waynesboro series have yellowish-gray to brown surface soils and red friable subsoils. These represent the oldest terrace formations. Only one type, the Waynesboro silt loam, is mapped in Meigs County. The Holston series differs from the Waynesboro in that the surface soils are prevailingly brown and the subsoils are yellowish brown and have a friable structure. Only one type, the Holston gravelly loam, is mapped. The Elk series is characterized by brown surface soils and light-brown subsoils. The Elk silt loam is the only member of this series found in the county.

The first bottom or present flood plain soils are classed in the Huntington and Atkins series. The Huntington series includes types with dark-brown soils and brown or dark-brown subsoils; the types in the Atkins series have gray to yellowish-gray surface soils and mottled yellow and gray subsoils.

Rough stony land includes material which is too rough for agricultural use.

In the following pages of this report the soil types are described in detail and their relation to agriculture discussed; the accompanying map shows their distribution in the county, and the following table gives the name and the actual and relative extent of each type mapped:

Areas of different soils.

Soil.	Acres.	Per cent.	Soil.	Acres.	Per cent.
Frederick gravelly loam	41,856	30.9	Waynesboro silt loam	4,928	3.6
Huntington silt loam	12,928	9.6	Elk silt loam	4,416	3.3
Hagerstown silt loam	12,672	9.4	Atkins silt loam	2,496	1.8
Dekalb silt loam	12,096	9.0	Colbert silt loam	2,432	1.8
Colbert silty clay loam	10,496	7.8	Decatur clay loam	2,048	1.5
Dekalb stony loam	10,240	7.6	Holston gravelly loam	1,728	1.3
Hagerstown gravelly loam	8,576	6.4	Rough stony land	1,536	1.1
Montevallo silty clay loam	6,592	4.9	Total	135,040	

HAGERSTOWN GRAVELLY LOAM.

The Hagerstown gravelly loam is a brown or yellowish-brown mellow loam or silt loam, underlain at about 6 to 12 inches by reddish-yellow to yellowish-red friable clay loam, which usually passes into a dull-red friable silty clay within the 3-foot section. Occasionally thin layers of white, soft, partly decomposed chert material are encountered in the subsoil. Small angular fragments of chert and limestone are abundant on the surface and throughout the soil and subsoil, being most abundant in the subsoil and substratum. This soil is an intermediate type between the Hagerstown silt loam and the Frederick gravelly loam and is of mixed origin, coming partly from the Chickamauga limestone and partly from the Knox dolomite. It includes areas of both types. Typically it is much less gravelly than the Frederick gravelly loam, a brighter or deeper red in color, and more productive, but it is not so productive a soil as the Hagerstown silt loam. It also includes areas of Decatur and of Waynesboro soils too small to be separately outlined.

This type is rather extensively developed, narrow strips occupying the lower slopes of the chert hills adjacent to the limestone valleys on both sides of the ridge. A few small areas occupy depressions or coves in the chert ridge, and other areas are found west and south of Bunker Hill Ferry. These last named, however, have been modified by a mixture of the waterworn Waynesboro material.

The Hagerstown gravelly loam seems to have come from the weathering of the Knox dolomite where this formation did not carry a very high percentage of chert. In places the cherty material has been carried down the slopes and mixed with the chert free soils from the Chickamauga limestone. Often it is found as small deltas or outliers in the limestone valleys, having been carried there by small streams.

In topography this type ranges from rolling to steeply sloping, the slopes of much of it being as steep as can be profitably farmed. Parts of it erode rather badly. Surface drainage is good to excessive and underdrainage good.

The type was formerly timbered, the forest growth consisting of a mixture of the growth found in the lower valley and that of the chert ridges but running principally to red, black, and post oaks. At present a large part of it is under cultivation, being used for corn, wheat, clover, soy beans and to some extent for strawberries. The crop yields as a whole are less than on the silt loam. Practically the same methods of handling are used. Land values are lower, ranging from $25 to $50 an acre.

The recommendations made for the improvement of the Hagerstown silt loam—increasing the organic matter and nitrogen, sweet-

ening by the use of ground limestone, deeper plowing, and checking of erosion—apply also to this type.

HAGERSTOWN SILT LOAM.

The soil of the Hagerstown silt loam consists of brown or reddish-brown mellow silt loam 8 to 15 inches deep. It rests upon reddish-yellow, reddish-brown, or dull-red friable clay or silty clay which continues to a depth of 3 feet or more and has a more intense red color and heavier texture with increasing depth. Where the type occurs in slight depressions or on gentle slopes the surface silt loam may extend to a depth of 24 inches, this often being the result of the accumulation of colluvial material from higher up the slope. Chert fragments are commonly scattered through the surface soil and subsoil, being usually more abundant in the latter. The type includes small areas of Hagerstown gravelly loam, and of Decatur and Colbert soils of insufficient extent to map separately. It also includes areas in which masses of limestone outcrop; these, where too small to be mapped as Rough stony land, are indicated by rock outcrop symbols. Near the Tennessee and Hiwassee Rivers a few areas have been modified by the old river deposits which belong to the Waynesboro soils. These areas are readily recognized by the rounded water-worn gravel which they carry, but the predominant material seems to be of residual limestone origin.

This soil has been derived principally from the weathering in place of the Chickamauga limestone, where conditions have been favorable for good underdrainage and thorough oxidation. The chert is from thin chert beds and lenses in the limestone or from chert washed down from higher lying beds of the adjacent Knox dolomite. The subsoil in places contains spots of dark-brown or black material, and in poorly drained areas small iron oxide concretions. A few areas in which the subsoil is a brownish-yellow plastic clay also have been included. Such areas really belong to the Shelbyville series, which is intermediate between the Colbert and the Hagerstown, being better drained than the typical Colbert soil, but more sticky and plastic than the Hagerstown.

The Hagerstown silt loam is the most important soil type in the county, occupying the valley in which Tenmile, Decatur, and Bigspring are situated. It has its best development in the northern part, where it occupies almost the entire valley, but is not so extensively developed farther south. From Goodfield to Bigspring it is developed in only a few small areas. South of Bigspring it again becomes an important type, rather extensive areas of it being developed near Brittsville, and near Georgetown. It occurs as irregular areas, but always within the belt or zone occupied by the limestone beds.

The topography is undulating to rolling, the areas occupying the gently sloping valleys, and in places the lower slopes of the adjacent ridges. Where nearly level areas occur they are commonly pitted with sinks or contain sinklike depressions without outlets.

Surface drainage and also the underdrainage of the greater part of the type is good. It was formerly heavily timbered with white and red oak, walnut, hickory, elm, hard maple, and a large number of other species. Practically all of the type has been cleared and brought under cultivation since the early settlement of this region.

The important crops are corn, wheat, hay, pasture grasses, and soy beans. All crops of the area including cotton, tobacco, millet, oats, and orchard and garden crops are grown on this type. Corn probably does not average over 20 to 30 bushels, and wheat 10 to 15 bushels, cotton one-fourth to one-third bale, and tobacco 500 to 800 pounds per acre. The greater part of the type has been farmed continuously for many years, with the use of little manure or commercial fertilizer, and without a crop rotation which would tend to build up the soil.

Land of this type ranges in price from $25 to $75 an acre, depending on the condition of the soil, character of the improvements, and location. Much of the type is not for sale even at the highest named price. The same grade of land where near lines of transportation and on good roads in other parts of the State sells at much higher prices.

Steps to improve this soil should include increasing the supply of humus and nitrogen, deepening the surface soil, preventing erosion, and neutralizing the acidity. The supply of organic matter and nitrogen can be increased by raising more live stock and using a larger proportion of the land for pasture, by carefully saving and applying all manures, and by growing more legume crops. Clover should be grown if practicable and a crop of soy beans or cowpeas used at least once in every three to five year rotation. The following rotations recommended by the Agricultural Experiment Station[4] at Knoxville are well suited to building up this type of soil:

General farming, five-year rotation: First year, corn followed by peas; third year, wheat or oats; fourth year, clover and grass; fifth year, clover and grass.

General farming, three-year rotation: First year, corn alone or with cowpeas manured; second year, wheat fertilized; third year, clover and grass.

Cotton planters, three-year rotation: First year, cotton (fertilized), crimson clover; second year, cotton and cowpeas or soy beans (manured); third year, oats followed by cowpeas or soy beans.

[4] Bul. No. 78, Tenn. Agr. Expt. Sta., 1906.

Although this soil has been derived from limestone, practically all of it has through long use and much leaching become acid or sour. This can be corrected through an application of burnt lime or ground limestone.

Difficulty is experienced by many farmers in obtaining a stand of clover. This in some cases is due to climatic conditions or disease, but in many cases results from the acid condition of the soil. There is an abundant local supply of limestone of high grade and by cooperating farmers can buy grinders and obtain ground limestone at a reasonable cost.[5] Where soils are only moderately acid an application of 2 tons of ground limestone once in 4 or 5 years will be sufficient. Not only will this be found beneficial in growing clover and alfalfa, but other crops will also be benefited. Where red clover does not make a good growth alsike clover will often thrive and is especially useful for pasturage.

Erosion is one of the serious problems in cultivating soil of this type especially where it extends up the steeper slopes. Deep plowing, the incorporation of organic matter, and the use of cover crops of rye, wheat, or oats during the winter are the best remedies where erosion has not reached an advanced stage.

R. S. Maddox, forester, Tennessee Geological Survey, makes the following recommendations for the reclamation of gullied lands:

> Where deep gullies have already been formed they should generally be reclaimed by first making in them dams of straw, sorghum pumice, or brush at such intervals as may be determined by the grade or slope of the gully bottom. These dams should be weighted down to anchor them safely against washing away or moving. Brush dams should have the bodies of the limbs or saplings, the brush from which has been used, cut into convenient lengths, and laid on top of them. Such weights are ordinarily enough to prevent the dam from moving. In the case of straw dams, it is an excellent plan to lay some brush over the straw and then to pile the weights on top of this. After constructing the dams the gully banks should be plowed off, rolling the dirt down the banks and into the gully bottoms (in some instances they can be dynamited advantageously) and then set in Bermuda grass, honeysuckle, black locust seedlings, or black locust sprouts. The Kudzu vine is also an excellent plant to use on such areas, as it is a legume, has a heavy root system, and produces a massive crop of vines, which make excellent forage for stock. Whatever growth is set in the gullies should have some cultivation or care the first year, to give it every opportunity to develop and become well established. The Kuduz vine takes root at the different leaf joints, and rooting may be encouraged by throwing a little soil on top of joints that lack contact with the ground. Locust seedlings or sprouts should be protected against grazing. Care for the first year usually allows these various growths to gain a firm footing.

DECATUR CLAY LOAM.

The Decatur clay loam consists of a red, dark-red, brown, or brownish-red friable clay loam, underlain at 6 to 10 inches by a

[5] Farmers interested in liming should read "Ground Limestone and Prosperity on the Farm," published by the Agr. Expt. Sta., Knoxville, Tenn.

brighter red or deep-red fairly friable clay, which passes downward into a deep-red rather stiff clay. At about 20 to 24 inches the subsoil is in many places compact, but otherwise there is little difference in the character of the material to a depth of 3 feet or more. The type includes small eroded patches of Decatur clay and small areas of Hagerstown silt loam and gravelly loam. On nearly level areas and in slight depressions colluvial material and wash from higher areas often collect. Such materials have a dark reddish brown color, a mellow structure, and in places a loamy texture. As mapped this type includes areas in which there is a large admixture of old terrace or Waynesboro material, readily recognized by the numerous rounded, waterworn gravel which it carries. Areas of this mixed origin have been included with this type rather than with the Waynesboro. They are found near Russell Ferry, east of Kingsfield Landing, between Goodfield Creek and Calico, and in other places.

This type is very sticky and plastic when wet, but is not difficult to handle when in good moisture condition. It is locally spoken of as "red mulatto land."

The type has a rather wide distribution in Meigs County, small areas of it being found in the main limestone valley and also in several places west of the chert ridge, but the total area is small and for this reason it is not an important soil type.

The topography is rolling to steeply sloping, some of the areas being as steep as can be profitably cultivated. Surface drainage is good to excessive, much of the type eroding rather badly. Underdrainage is good.

All this type was originally heavily forested, the growth consisting principally of red, white, and black oak, walnut, hickory, elm, poplar and shortleaf pine. Practically all of it has been under cultivation, but some badly eroded areas are now abandoned and grown up in sassafras and old-field pine.

Corn, wheat, cotton, and clover are the principal crops grown on this type, but all other crops of the area are grown to some extent. Where the soil is well handled it is the most productive upland soil of the county, the crop yields being slightly better than on the Hagerstown silt loam.

It is used to a greater extent for cotton than are the other soils, the yields ranging from one-fourth to three-fourths bale per acre.

No farms are located entirely on this type, but where a considerable area of it is included in a farm the price is about the same as for a good grade of the Hagerstown silt loam. The same methods of handling and of building up the land are needed as for the latter type.

COLBERT SILT LOAM.

The Colbert silt loam, to a depth of about 6 to 10 inches, consists of a light-gray or yellowish-gray loose mellow or flourlike silt loam. The subsoil is a pale-yellow or yellowish-gray heavy silt loam passing into a drab or mottled yellow plastic clay in the lower part of the 3-foot section. In the more poorly drained areas the surface soil is a gray to almost white silt loam, underlain by a light-gray or yellowish-gray heavy silt loam to silty clay loam. In places the surface layer has a brownish cast. Small iron concretions are distributed through the soil and subsoil, being more abundant in the flatter areas. The type is generally spoken of as "white crawfishy land."

There has been included with the Colbert silt loam a gravelly variation in which the soil is typical in appearance at the surface but carries a high percentage of small sharp chert fragments. In the subsoil this cherty material is often so abundant that it forms an almost impervious cherty layer or hardpan, apparently slightly cemented, which greatly restricts underdrainage. Bodies of this gravelly variation occur where small streams from the cherty ridges enter the valley. Narrow strips of it follow stream courses for considerable distances near their source in the ridges and other areas occur as second bottoms along the large streams in the limestone valley. The type also includes small areas of fine sandy loam, which have been deposited by overflow along some of the larger creeks.

The Colbert silt loam is closely associated with the Colbert silty clay loam, but is much less extensive and is not an important type in the area. It is also of lower agricultural value, being used principally for grass land, although some of it is in cultivated crops. The gravelly areas are of little agricultural value.

COLBERT SILTY CLAY LOAM.

The Colbert silty clay loam consists of a gray, dark-gray, or brownish-gray silt loam to silty clay loam which passes rather abruptly at a depth of 8 to 12 inches into a tough, plastic yellow silty clay mottled with gray. This in turn grades into a greenish-yellow to drab heavy plastic clay. Small iron concretions are found in the surface soil and subsoil, being very abundant in poorly drained areas. This type is of limestone origin coming from beds which on account either of their position or composition have restricted underdrainage, thus preventing thorough oxidation. It includes numerous small areas of Hagerstown soils and also areas in which rock ledges and outcrops are abundant. Such areas if of sufficient extent would be mapped as Colbert stony loam; their presence is indicated by rock outcrop symbols. Small areas of Colbert silt loam have

likewise been included, these usually occurring along small streams or as small areas of second bottom occasionally subject to overflow.

This type is rather extensively developed in Meigs County. In the upper part of the limestone valley, areas of it are found from Ten-mile south to Davis Academy. Beginning again near Decatur the type increases in extent toward the southern part of the valley, a large body of it extending from Goodfield south almost to the Hiwassee River, and another larger area lying between this stream and Georgetown. A few small areas of the type are found west of the chert ridge.

The topography of this soil is nearly level to undulating. Parts of it are so nearly level that surface drainage is not good, and underdrainage of the greater part of the type is restricted. This is a rather important type agriculturally, probably 75 per cent of it being under cultivation. It was originally timbered, the forest growth normally including a high percentage of post oak, water oak, and willow oak. It is used for the production of corn, wheat, oats, redtop, timothy, pasture grasses, and cowpeas and soy beans. Although some areas yield almost as well as the Hagerstown soils, the type as a whole is generally recognized as being less productive. It is not well suited to clover, although alsike probably can be grown on the better drained areas, but is well suited for pasture grasses and small grains. Corn yields from 15 to 25 bushels and wheat 10 to 12 bushels per acre.

This land ranges in price from $20 to $45 an acre, depending upon the soil, the location, and the character of the improvements.

Some of the type can be improved by draining, although the numerous rock outcrops and the shallow soil in most places prevent the installation of any very complete system of either surface or underdrainage.

FREDERICK GRAVELLY LOAM.

The Frederick gravelly loam consists of 8 to 10 inches of light-gray or yellowish-gray to yellowish-brown silt loam, underlain by a pale-yellow or reddish-yellow compact silt loam or silty clay loam, which at depths of 12 to 20 inches or more changes to a red or dull-red heavy clay becoming redder with depth. Sharp chert fragments and some flinty dolomite fragments are found scattered over the surface and distributed through the soil and subsoil. The amount, kind, and distribution of the chert varies widely. In the typical soil the rock is usually white or reddish brown, and the fragments sharp, small, varying from less than one-half inch to 2 or at most 3 inches, and rather evenly distributed from the surface downward or increasing in quantity in the subsoil. The proportion of chert varies from 25 to probably 75 per cent of the soil mass. In

places the fragments are larger and more abundant, the type being a stony loam, while in others the red clay loam comes near the surface and chert is less abundant, such areas approaching the Hagerstown gravelly loam. The type also includes areas in which both surface soil and subsoil are light ashy gray. Such areas occur principally on rather steep south slopes. The soil here belongs in the Clarksville series and is a gravelly or stony loam. Along the upper courses of small streams where underdrainage is restricted and there is also an accumulation of silty material from the adjacent slopes, the soil is Clarksville silt loam. These various small areas are not of sufficient importance agriculturally to justify their separation from the Frederick.

The Frederick gravelly loam is the most extensive soil type in the area. It occupies a strip approximately 2 miles wide west of the limestone valley, and extends from the extreme north almost to the extreme south end of the county, a distance of 32 miles. On the east side of the county a strip, varying from one-fourth to over 1 mile in width, extends from the Hiwassee River to the Roane County boundary, a distance of 24 miles. Extending southwest from Shiloh Church is an area 4 miles long and three-fourths mile wide; another extends north from Pinhook Island, still another lies in the vicinity of Gravel Hill School; and there are a few small detached areas throughout the county.

The topography ranges from undulating to rolling with numerous areas that have slopes about as steep as can be cultivated profitably, and some that are too steep for cultivation.

The surface drainage of the entire type is good, numerous small streams and their tributaries extending into all parts of the ridges. The greater number of these empty into the valley streams but some flow into sinks which have subterranean outlets. Although the slopes are in many places steep the soil does not erode very badly, owing to the protection afforded by the gravel. The type is forested with post and black oak, blackjack oak, red oak, some white oak, and some shortleaf pine, chestnut, poplar and other species. Practically all the merchantable timber has been removed and it now supports in most places a dense growth of small post oak and blackjack. Owing to the difficulty of clearing and cultivating this soil it has never been regarded with very high favor by the farmers of this region, and probably not more than one-tenth of it is at present under cultivation.

During the last few years the growing of strawberries has received considerable attention in Meigs County and a considerable acreage is now grown, principally on this soil type. The present season (1919) there were 434 acres devoted to this crop, and owing to high prices it is expected the acreage for next season will be much larger.

New ground is found best suited for strawberries. The plants are set out in the spring, kept thoroughly cultivated, and produce a crop the following spring. Most of the plantings consist of the Klondike, which begins to ripen about the 1st of May or the Aroma, a later variety that extends the harvest up to the 10th of June. The cost of putting out and cultivating an acre of strawberries to the time of bearing is estimated at about $75 an acre. The acerage yield ranges from 75 to 100 crates per acre. One setting of plants is usually allowed to bear three years, but sometimes the plants are allowed to stand for four or even five years.

Tomatoes are also well suited to this type of soil and in 1919, 50 to 60 acres were in this crop to supply a cannery near Decatur.

During recent years the Frederick gravelly loam has been used to some extent for corn, wheat, and pasture land. Where the chert fragments are not too large and the red clay subsoil comes near the surface, fair yields are obtained, corn yielding 10 to 25 bushels or more, and wheat 8 to 12 bushels per acre.

When cleared, improved, and planted to strawberries this soil sells in small tracts at prices ranging from $40 to $60 an acre, but where unimproved much of it can be had at $10 to $20 an acre.

From results obtained on land of this character in other places it is believed that one of the best uses to which it can be put is to clear and fence it and put it directly into pasture grasses without using it for cultivated crops. To kill the sprouts requires about three years. This may be done by hand sprouting, by the use of sheep or goats, or by deadening the trees and pasturing closely with cattle. Mixtures of grass, including bluegrass, redtop, orchard grass, and white clover should be used.

The better areas of this soil can be built up by growing nitrogen-producing crops and using manure and phosphatic fertilizers until it gives fair yields of corn, wheat, and other crops. If clover or alfalfa is to be grown, ground limestone or burnt lime will probably be necessary. Lime will prove beneficial to other crops as well as to these legumes.

In other sections soil of this character is found well suited to apples, grapes, berries of all kinds, and to cherries and other fruits.

DEKALB STONY LOAM.

The soil of the Dekalb stony loam, to a depth of 6 to 10 inches, consists of a gray, pale-yellow, or purplish fine sandy loam, very fine sandy loam or silt loam. The subsoil is a pale-yellow or purplish fine sandy clay. Sandstone fragments are abundant over the surface and distributed through both soil and subsoil. These are harder and more abundant and larger in size on and near the crests of the ridges, where the sandstone is gray or yellowish. On the slopes the sand-

stone is softer, the fragments are smaller, and material from both the light-colored and the purplish beds of sandstone is found. These purplish soils are not typical Dekalb and if mapped would be placed with the Upshur series, but they are not considered of enough importance here to warrant separation. The type as mapped also includes numerous areas of Dekalb silt loam, the separation of these types being a rather arbitrary one based partly on the topography.

The Dekalb stony loam occupies all of Ten Mile Ridge, except a narrow rim around the base, the higher parts of Hurricane Ridge and of the ridge which separates No Pone Valley from the limestone valleys, and the highest parts of the Texas Knobs. The hard sandstone forms the backbone of these ridges. The crest of the ridges is sharp and usually stony, and the slopes are in most places too steep for profitable cultivation. The type was originally forested with oak of several varieties, shortleaf pine, gum, hickory, and poplar. The greater part of the merchantable timber has been removed, but a few small mills are still at work, obtaining their timber from the more remote parts of the ridges. Only a very small part, probably not over 5 per cent of the type, is under cultivation, the areas mapped lying along the base of the slopes bordering the silt loam. A few more of these lower slopes can be brought under cultivation.

The type can be most profitably used for pasture and for its forest products. Where the trees are deadened or removed this soil is said to produce orchard grass, redtop, and the native wild grasses well. Land of this type ranges in price from $5 to $20 an acre.

DEKALB SILT LOAM.

The Dekalb silt loam consists of light-yellowish or grayish-brown silt loam 6 to 8 inches deep, underlain by a compact pale-yellow silty clay loam, often with a slight olive tint, and grading below into a yellowish-brown, friable, silty clay sometimes mottled with drab and yellow. Locally the surface soil is a brown or red silt loam or loam having a light-brown silty clay subsoil. In places where conditions have been favorable for weathering or where there has been deposition of material in depressions or at the foot of slopes the soil may extend to a depth of 24 to 30 inches before the underlying shale is reached. Over much of the area covered by this type, however, the parent shale lies at a depth of only 15 to 20 inches and in many places it comes within 6 inches of the surface and is turned up by the plow in cultivated fields. The type includes areas of very fine sandy and loamy material, such areas usually carrying a considerable amount of small thin fragments of shaly sandstone. Many of these areas are purplish in color but others are gray to light brown. The type also includes small areas of the heavy purplish Montevallo silty

clay loam. The Dekalb and Montevallo soils are commonly spoken of as "slate land" and are closely related in origin.

The Dekalb silt loam is an important type on account of its extent rather than on account of its agricultural value. It occupies the greater part of the numerous small valleys between McMinn Ridge and the limestone valleys and extends well up the lower slopes of Ten Mile Ridge and the Texas Knobs. In the southern part of the county a considerable area of it extends from near Goodhope Church to the county boundary south of Gravel Hill School. This last named area, however, is mixed somewhat with both the old river terrace material and with the Montevallo silty clay loam. Where drainage is poor the type includes small areas of Colbert silt loam.

The greater part of this type—that is, the part which occupies the valleys—is gently rolling to rolling; very little of it is level. Where it extends up the adjacent ridges the slope is rather steep, some of it being too steep for cultivation. The surface drainage of the greater part of the type is good and on the steep slopes excessive, the run-off being so rapid that the soil erodes seriously. Underdrainage is also good and, owing to the position of the shale beds so near the surface, crops suffer during periods of drought.

The type was originally forested with post oak, blackjack oak, sweet and black gum, poplar, shortleaf pine, and other trees of this region. The larger part of the type lying in the valleys has been cleared and cultivated, but some of the badly worn and eroded areas have been abandoned and allowed to grow up in sassafras, old-field pine, scrub oak, and briers. Probably less than half the type is under cultivation.

The Dekalb silt loam is used in the production of corn, pasture and hay grasses, wheat, oats, cowpeas, soy beans, and to some extent cotton. It is generally recognized as a soil of rather low productiveness, best suited to timothy and redtop, to wheat and oats, and to cowpeas and soy beans. Clover can not be grown successfully on it without the use of lime. Corn yields 12 to 25 bushels, wheat 6 to 12 bushels, and oats 15 to 25 bushels per acre.

Land of this type can be bought at prices ranging from $5 to $25 an acre, the price depending on condition of soil, improvements, and location.

The Dekalb silt loam responds readily to manure and commercial fertilizer and can be built up by their use, by growing legume crops, and by pasturing with stock. Owing to the leachy nature of the subsoil and its nearness to the surface over much of the type this soil does not retain its fertility very long, even after being built up, but must be continually improved. There are some well improved farms on this type which are fairly productive, being used for nearly all

crops of the area. Much of the type, however, can be utilized most profitably as pasture land.

MONTEVALLO SILTY CLAY LOAM.

The Montevallo silty clay loam is a pale-gray or mottled gray to brown silty clay loam, grading at 3 or 4 inches into a pale-yellow to yellowish-brown or purple silty clay to clay having a tough compact structure. At 15 to 18 inches this grades into a somewhat more friable mottled silty clay loam of varying color, purple, pink, brown, yellow and olive green tints being conspicuous. In places the disintegrated shale is reached at from 2 to 3 feet below the surface.

This type is much heavier in texture and has a more profuse mottling of purple, red, and pink in the subsoil than has the Dekalb silt loam. As a whole it may be slightly less productive, although parts of it are quite as good. It is slightly mixed with and modified by materials from the Waynesboro and Holston soils. In topography and general appearance it differs but little from the Dekalb silt loam.

The principal areas of the type lie north of Euchee, northeast of Peakland, and west of Calico. Areas occur in other places west of the chert ridge and small areas have been included with the Dekalb silt loam. Where poorly drained there are included areas of the Colbert silt loam. The soil is heavy and rather difficult to cultivate, and not very drought resistant.

The Montevallo silty clay loam was formerly forested, but much of it has been cleared and probably one-third of it is at present under cultivation. Corn yields 15 to 25 bushels, wheat 8 to 12 bushels, and oats 15 to 20 bushels per acre. It produces hay and pasture grasses but not clover. The soil responds readily to manure and commercial fertilizers and can be greatly improved by growing legume crops and by liming.

WAYNESBORO SILT LOAM.

The Waynesboro silt loam is a light-gray to pale-yellow silt loam of light texture, grading at 5 to 10 inches into a pale-yellow silt loam slightly tinged with red and becoming heavier with increasing depth. At 16 to 20 inches this grades into a distinctly red fine sandy clay containing some waterworn pebbles. Small eroded areas show the red subsoil giving cultivated fields a gray and red mottled appearance. The type includes small areas of Waynesboro gravelly loam, in which the waterworn gravel is abundant both on the surface and mingled with the soil and subsoil. It also includes areas in which the old terrace material, of which the principal part of this soil is composed, is mixed more or less with Decatur or with Hagerstown material, and in such situations it has some of the characteristics of these soils. In other places it has been deposited so

thinly over shale beds that the underlying shale is exposed on gall spots and in gully banks. This type is locally referred to as "red mulatto land."

The type is of rather small extent. The principal areas are near Fellowship Church, southeast of Peakland, and on the south side of Hiwassee River near its mouth. It covers some of the highest hills near the Tennessee River and also occupies the slopes immediately above the second bottoms of that stream. In no place in the area does the topography resemble that of a terrace. In many places the gravel alone remains covering other soil types, the other terrace material having practically all been removed. The topography is rolling to broken. Drainage in places is excessive and the type has suffered from erosion.

The type was originally heavily forested, the growth in places consisting largely of post oak and blackjack oak and in other places of these trees with chestnut, red oak, white oak, poplar, sweet gum, and other species.

Approximately half the type is under cultivation. It is used for corn, wheat, and all the other crops of the region. The yields and land values are about the same as for the Hagerstown gravelly loam.

HOLSTON GRAVELLY LOAM.

The Holston gravelly loam is a light-gray to almost white silt loam, grading at 4 to 6 inches into a pale-yellow silt loam which in turn grades at 12 to 15 inches into a heavy silt loam or silty clay loam of about the same pale-yellow or mottled yellow and gray color. Scattered over the surface are large quantities of rounded, water-worn gravel, ranging from one-half inch to 3 or 4 inches in diameter. In places these entirely cover the surface, and make up from 50 to 75 per cent of the soil mass. In the subsoil, where it was possible to make an examination, it seemed that the gravelly material was less abundant. In many places this surface covering of gravel rests upon some other soil type having been left from erosion.

This type is developed on the high terraces along the Tennessee River.

The topography is flat and the soil is only moderately drained. The greater part of it is covered with post oak and blackjack oak.

The type is of small extent and of little agricultural value.

ELK SILT LOAM.

The Elk silt loam is typically a pale-yellow to light-brown silt loam, loose and friable to a depth of 6 to 12 inches, below which it becomes distinctly heavier and more compact, being a heavy silt loam to clay loam of light-brown color. At a depth of 20 to 24

inches the color is lighter and shows mottlings of gray, and the structure is looser and more friable. The type has rather wide variations as to depth of surface soil. In large areas that have not been eroded badly the surface soil is deep and rather dark, resembling in appearance and crop value the Huntington silt loam of the adjacent first bottom. Much of the type, however, has been dissected by small streams entering the main valleys through the terraces, leaving numerous steep slopes where the surface soil has been removed and the heavy subsoil exposed. The type is subject to overflow only during periods of unusually high water, but when overflowed it is by swift-flowing currents which cut away the surface soil rapidly, leaving a thin soil or the subsoil exposed. Much of the type carries small amounts of waterworn gravel, and over small areas the quantity is sufficiently great to reduce the crop value of the land.

The Elk silt loam occurs on the second bottoms or terraces of the Tennessee River, the Hiwassee River, and Suee Creek. Areas of it too small to be outlined are found in a few places along other streams of the area. A large area extends south from Euchee. Another extends north from near the mouth of Suee Creek. An almost continuous strip follows the river from Henry Ferry to Armstrong Ferry. The type occupies the principal part of Jolly Island, and numerous areas lie along the south side of the Hiwassee River Valley. It occurs as benches or table-land, usually on the outer edge of the valley proper and separated from the lower or present flood plain by an abrupt drop of 20 to 40 feet or more. Often a small natural drainageway or an open ditch extends along the valley immediately below this bench. The outer or river side of the terrace is highest, the surface usually having a slight slope away from the stream. At the edge of the terrace adjacent to the upland there is another small drainageway, but this is in many places wanting, the terrace blending with the lower slope of the uplands.

Drainage of the greater part of the type is good. There are some flat poorly drained spots, while around the steep sloping edges drainage is excessive and rapid run-off has caused some injury by erosion.

The type is used principally for the production of the grasses including redtop, timothy, and clover. Practically all the type is under cultivation. Corn yields range from 15 to 30 bushels per acre. Much of the type is in a "run down" condition owing to continuous cropping. It should be built up by pasturing with live stock, and the more extensive growing of legume crops. Much of it needs liming.

This type of soil is usually held in connection with the more productive first-bottom land. Some of it is old and badly leached; other

areas, usually lower lying, are younger, more frequently overflowed, and also much more productive. In price it probably ranges from $40 or $50 to $100 or more an acre.

HUNTINGTON SILT LOAM.

The surface soil of the Huntington silt loam is a brown to dark-brown silt loam which at a depth of 3 or 4 inches grades into a heavier silt loam. This continues uniform in color and texture to about 20 inches, below which the material is lighter brown. Distributed through the soil and subsoil are numerous fine particles of mica. The type includes areas of very fine sandy loam, these occurring principally along the river bank, where the sand has been deposited by swift currents during periods of overflow, and on the smaller islands in the Tennessee River. In some places the surface few inches consists of a thin layer of very fine sandy loam, and in a few places the surface has been covered by deposits of sand. The type also includes some poorly drained areas in which the surface soil is light gray and the subsoil mottled. Areas of this kind are most abundant in the valleys of Suee Creek and other smaller streams, these areas really representing soils of the Atkins series. In general, the Huntington silt loam in the river bottoms is rather uniform in color, texture, and crop value, but in the small stream valleys it is subject to numerous variations and as a whole is not so productive as along the rivers.

This is the most important type in the river bottoms, strips, varying from one-eighth to one-half mile in width, extending along most of the course of the Tennessee and Hiwassee Rivers. Smaller bodies lie along the streams that flow through the limestone valley and in some places where the material has come from the chert ridges.

Surface drainage of the greater part of the type is good, but it is practically all subject to overflow. Floods often occur before the crop matures or has been gathered and serious losses result.

The Huntington silt loam was formerly heavily forested with white oak, red oak, and willow oak, sweet gum, elm, ash, walnut, sycamore, and maple. It is at present practically all under cultivation and is an important factor in the agriculture of the county.

The principal crop is corn, probably three-fourths of the type being planted to this crop every year. It is used also for the production of clover and timothy hay and to a smaller extent in growing wheat, oats, and pasturage. Corn yields from 25 to 60 bushels per acre, the average probably approximating 40 bushels. Clover gives two cuttings and yields a total of 2 to 3 tons per acre. A large part of this land is farmed by tenants who furnish everything and give as rental one-half the corn delivered at landings. No fertilizers are used.

Very little of this land is for sale, but when sold it brings $100 to $200 an acre.

ATKINS SILT LOAM.

The surface soil of the Atkins silt loam is a pale-gray to almost white silt loam grading into a pale-yellow silt loam of heavier texture. At 12 to 15 inches the soil passes into a pale-yellow sticky sandy clay mottled with gray. Like most alluvial soils the type is subject to rather wide variations, and it includes areas of sandy loam, fine sandy loam, and along some of the small streams a soil closely resembling the Colbert silt loam. It is a low-lying, poorly drained, white soil, locally called "crawfishy land." The principal areas lie along the small streams which flow through the shale valleys. Small areas also occur in the limestone valleys. These have been included with the Huntington silt loam. In the valley of the Tennessee River areas of soil in which the subsoil resembles that of the Atkins silt loam, but which have a surface covering of 3 to 6 inches of brown silt loam have been included. Such areas have a crop value intermediate between that of the Huntington and the Atkins silt loam.

The type is used principally as pasture land, being seeded to redtop, timothy, bluegrass, and lespedeza. It is not an important soil type.

The following table gives the results of mechanical analyses of samples of the soil and subsoil of the Atkins silt loam:

Mechanical analyses of Atkins silt loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
401827	Soil	1.4	4.4	2.7	12.1	13.7	50.8	15.0
401828	Subsoil	2.2	5.5	3.3	12.2	12.7	40.1	23.9

ROUGH STONY LAND.

Rough stony land consists of areas in which rock outcrops are so abundant that the land has little or no value for cultivated crops. The outcrops consist of heavy limestone beds lying horizontally or almost so, or of the exposed edges of upturned beds. In places these extend for long distances, having the same general trend as the valleys and ridges of this region. In many places small areas of Rough stony land have been included with the surrounding soil type because not of sufficient extent to be shown separately. Parts of the Frederick gravelly loam and of the Dekalb stony loam might be classed as Rough stony land, but the term has been confined to regions of limestone outcrop only.

The principal forest growth on areas of Rough stony land is red cedar, which grows quite abundantly among and on the rocks. Some of this cedar timber has been shipped out and much of it is used locally for fence posts and for building purposes. This type is valued principally for its growth of cedar but in places as pasture land, the pasturage value being rather low.

SOIL TREATMENT.

In two important respects the soils of Meigs County are very much alike. (1) They are all light in color and contain therefore a relatively low percentage of organic matter. Since the soil nitrogen is derived to a great extent from the soil organic matter the nitrogen supply therefore is low. (2) They have a uniformly low percentage of lime, potash, and phosphoric acid. While the various soils are not uniform in the amounts or percentages of these constituents which they contain, they are uniform in having a percentage so low that their crop production is strongly influenced by that fact.

While they have been derived from rocks that vary rather widely in chemical composition, it is a well-known fact that the chemical composition of the soils is much more uniform throughout the county and the region in which it occurs than is that of the rocks themselves. Some of the rocks, for example, have a lime carbonate content amounting to as much as 90 per cent and a potash content of more than 3 per cent, but the content of phosphoric acid is rarely more than 0.3 per cent. In the soils derived from these rocks, on the other hand, the percentage of lime carbonate is usually too small to be determined by usual methods. It may be said with safety that carbonates do not exist in them in sufficient quantity to have any perceptible effect on their crop-growing capacity, except in those rare cases where the soil is very shallow and a part of it consists of freshly disintegrated limestone rock. In the mature agricultural soils of the region such conditions do not exist over any important area. The percentage of lime carbonate may be considered therefore as practically nil. Analyses of soils from the general region in which Meigs County lies show a range of potash content varying from less than 0.5 per cent to a little more than 1 per cent. In rare cases it may run as high as 2 per cent. The percentages of phosphoric acid range from about 0.04 per cent to about 0.25 per cent. These figures are taken from unpublished analyses of soils from eastern Tennessee made in the laboratories of the Bureau of Soils.

In changing from rock to soil a general leveling process has been in operation, so that the soils of the region are much nearer alike than are the rocks from which they have been derived. The weathering processes which have made soils out of the various soil materials

found in the county and the region have tended to reduce the soils, chemically, to one uniform character. The more easily soluble materials go first in the weathering processes and then follow the more easily decomposable minerals until we may readily conceive of the attainment of a final stage of weathering in which all the soils from all the various rocks would have been reduced to a uniform chemical composition. This stage has not yet been reached in Meigs County, though all the readily soluble materials have long been removed from the soils and all the readily decomposable minerals have been decomposed and a large part of their soluble constituents removed from the mature soil.

Since experience has shown that a certain proportion of lime carbonate, soluble potash, phosphoric acid, and nitrogen are necessary for the production of maximum crops, and since the soils of this region have a low percentage of these constituents, we are justified in the assumption that the crops obtained on even the best of these soils are not maximum crops, and that an increase in yield would result from the application of these constituents to these soils. That this is true has been shown by experimental work carried out on soils of this general region by the Tennessee Experiment Station.[6]

On a very poor soil, a soil seemingly somewhat less productive than any within Meigs County, increases in yields of corn were obtained by the application of 300 pounds of acid phosphate in each of two successive years, and a smaller increase was obtained by the use of lime. The pasturing of crops grown during two immediately preceding years produced a slight increase. A large increase, however, was obtained by plowing under crops of cowpeas during each of the two preceding years. While these experiments showed but a slight increase following the application of lime, it is well known that corn does not respond to that treatment as well as clover or other leguminous crops. In order to be able to produce good crops of the latter, the bulletin shows that the application of lime is necessary.

Experiments with potatoes were conducted on nine series of three plots each on nine different farms. On the first plot of each series no fertilizer was used, and on the second and third plots 750 and 1,500 pounds, respectively, of complete fertilizer were used. The fertilizer in each case consisted of high-grade acid phosphate, muriate of potash, and cottonseed meal.

Increased yields, ranging from 30 per cent to 400 per cent, were obtained by the use of the smaller quantity of fertilizer and from 45 per cent to 550 per cent by the use of the larger quantity. Nothing is contained in the bulletin to show what soils were experimented on, and on which kinds the various increases were obtained. The sig-

[6] The Rational Improvement of Highland Rim Soils, by C. A. Moers. Bulletin 102, Agri. Expt. Sta., Univ. of Tenn., Knoxville, Tenn., 1914.

nificant fact is, however, that increases were obtained on all the soils experimented with, and in each case the percentage of increase was important. In summarizing the matter, therefore, we may say that investigations both in the laboratory and in the field of the soils of the region in which Meigs County lies, show that they are all low in their content of the chemical constituents usually required in a productive soil, and that in the practical utilization of these soils the application of fertilizers containing nitrogen, potash, and phosphoric acid will cause increases in the yields of crops and that the use of lime with phosphoric acid and potash is necessary for securing good yields of clover and alfalfa, but that the application of lime to other than leguminous crops does not cause increases in yields as large as does the application of the other substances mentioned.

From information obtained in other regions of the country in which the soils, so far as their content of lime is concerned, are similar to those in Meigs County, it may be stated also that while the application of lime alone does not bring about much increase in the yield of grain and potatoes it is well known that its application enables the farmer to grow clover, and through the growth of the latter the soil is improved to such an extent that the yield of the grain and potato crops is much increased. It should not be forgotten, however, that even with the improved condition brought about by the growth of clover these soils need, in order to produce large yields, applications of phosphoric acid and potash in some form. The results reported in the bulletin cited above show that the muriate of potash and the acid phosphate are compounds of these substances which will give favorable results.

While chemical conditions in the soils of the area are such as to cause at least all the upland soils to respond to the treatments just described, regardless of the particular type with which each soil was identified in making the soil survey, it is well known that chemical characteristics alone do not determine the productive capacity of the soil. Their physical characteristics, such as texture and structure, the relations of soil to subsoil, and to the rock underneath, their drainage characteristics as indicated by the completeness of the subsoil oxidation, the topography and stone content, are all factors of great importance. In fact, in one sense they are more important than are chemical characteristics, since the latter may be modified with ease and at little cost, but disadvantages caused by physical characteristics are much more difficult to avoid. The physical character of a soil is not easily changed. A heavy intractable clay can not easily be changed to a soil of any essentially different texture. A soil with a heavy or otherwise impenetrable subsoil can not be changed to one with a more favorable subsoil except at such tremendous expense that

its feasibility on a farm or even good-sized field scale is not possible under existing conditions.

There are 14 types of soil in Meigs County, but on the basis of their physical characteristics, especially texture, they may be grouped into about half that number of groups. The first group we may select is the gravelly group made up of the Holston, Frederick, and Hagerstown gravelly loams. They are all gravelly, but not sufficiently so to make their cultivation difficult.

The Waynesboro, Hagerstown, Dekalb, Elk, and Huntington silt loams constitute a group which includes the most productive soils of the county. They are not heavy enough to make tillage difficult, nor light enough to cause leachiness and droughtiness. None of them have any unfavorable subsoil characteristics, either in the form of a hardpan or heavy intractable clay nor in the form of droughty gravel beds. Both the Elk and Huntington overlie gravel beds in places, but they are too deep to produce any unfavorable effect on the soil. The subsoil of the Huntington silt loam is a little less compact as a rule than that of the other series, but, as has been stated, none of them have unfavorable subsoils.

The Colbert silt loam stands in a group somewhat to itself in that it has, as a rule, a slightly compacted subsoil which has a tendency to cause water-logging of the subsoil during wet weather.

The Decatur clay loam is a heavy soil. Its content of the mineral and organic constituents usually regarded as necessary in a fertile soil is as high as in the best of the other soils, but its heavy texture gives it a somewhat unfavorable water holding and water releasing capacity. It is more difficult to work than the lighter textured soils.

The Colbert silty clay loam and the Montevallo silty clay loam are not so difficult to work as the Decatur clay loam nor so easily worked as the silt loams. In other respects they are about equivalent to the Colbert silt loam.

The Atkins silt loam is a poorly drained alluvial soil needing tile or open ditch drains. With the installation of these it becomes much more productive than under its native condition.

The Dekalb stony loam is difficult to work because of the stones present in the soil. On removal of these it becomes about, as a rule, equal in value to the Colbert silt loam.

SUMMARY.

Meigs County, Tennessee, comprises a long narrow strip of territory bordering on the Tennessee River in the eastern part of the State.

Its topography consists of narrow parallel ridges and valleys with a northeast-southwest trend. The valleys have an elevation of about 800 feet above sea level and the ridges lie about 300 feet higher.

The area is well drained, the smaller streams following the general slopes, but the larger ones cutting across ridges and valleys regardless of present topography. All the drainage is into the Tennessee River and its tributary, the Hiwassee River, the county having an extensive front on these two streams.

The county is rather sparsely settled, the total population in 1920 being only 6,077. The principal settlements are in the valleys, those underlain by limestone being more thickly populated than those in which the country rock is shale. There are some settlements on the chert ridges and a very few on the shale ridges.

There is no railway within the county nor within several miles of its borders. Grain and hay are shipped out by boat and heavier freight is received in the same way. Mail is received from various points on the Southern Railway outside the county. Decatur, the county seat and only town in the county, has a population of 142.

Roads are poor and many sections of the county have no telephone service. Chattanooga and Knoxville are the principal markets.

The principal crops are corn, hay, wheat, cowpeas, and soy beans. Some cotton, tobacco, sorghum, millet, and oats are grown. Strawberries have become a rather important special crop and some tomatoes and beans are grown for local canneries.

Of live stock, cattle are the most important, but hogs, sheep, horses, and mules are raised.

Farm improvements and equipment are good in the river bottoms and limestone valleys, medium to poor in the shale valleys, and poor on the ridges.

Land prices range from $5 to $20 an acre for unimproved ridge land, but such land when improved brings somewhat better prices. For improved limestone valley land, the range is $40 to $75 an acre and river-bottom land from $150 to $200 an acre.

The underlying formations consist of limestone and shale in alternating folded beds, thin beds of sandstone being associated with the shale. The soils of the upland are residual in origin, having been formed from the disintegration and weathering of these beds. The soils of the river and small stream valleys have been eroded from the upland soils, assorted, and deposited in the stream flood plains.

The soils derived from limestone are classed in the Hagerstown, Decatur, and Colbert series. Of these the Hagerstown silt loam is the most important, being of rather large extent and suited to all crops of this region. The Hagerstown gravelly loam is also widely distributed but of somewhat lower crop value. The Decatur clay loam is productive but of small area. The soils of the Colbert series have, as a rule, poor underdrainage.

Of shale and sandstone soils the Dekalb silt loam occupying the valley of the eastern part of the county is the most important. The

Dekalb stony loam occupies the higher portions of the ridges and the Montevallo silty clay loam occurs principally in the western part of the county. All of these have a rather low crop value.

The dolomite ridges are occupied by the Frederick gravelly loam, a soil which is being utilized to only a small extent. It is held at low prices and offers considerable possibilities for growing strawberries and other small fruits, for use as pasture land, and for the production of the general farm crops.

The Waynesboro and Holston soils represent fragments of old, high river terraces. They are of small extent and the Holston is of low crop value.

The second-bottom soils are classed with the Elk series and the first-bottom lands with the Huntington series. Only the silt loams are developed. The Huntington is the most valuable and most productive soil of the county.

The Atkins silt loam is a light-gray poorly drained soil occupying some of the small stream valleys. It is used mainly for pasture.

○

[PUBLIC RESOLUTION—No. 9.]

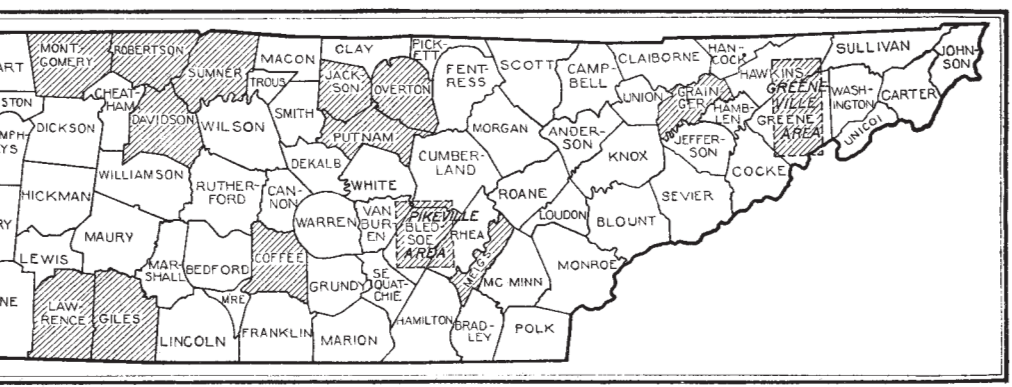
JOINT RESOLUTION Amending public resolution numbered eight, Fifty-sixth Congress, second session, approved February twenty-third, nineteen hundred and one, "providing for the printing annually of the report on field operations of the Division of Soils, Department of Agriculture."

Resolved by the Senate and House of Representatives of the United States of America in Congress assembled, That public resolution numbered eight, Fifty-sixth Congress, second session, approved February twenty-third, nineteen hundred and one, be amended by striking out all after the resolving clause and inserting in lieu thereof the following:

That there shall be printed ten thousand five hundred copies of the report on field operations of the Division of Soils, Department of Agriculture, of which one thousand five hundred copies shall be for the use of the Senate, three thousand copies for the use of the House of Representatives, and six thousand copies for the use of the Department of Agriculture: *Provided*, That in addition to the number of copies above provided for there shall be printed as soon as the manuscript can be prepared, with the necessary maps and illustrations to accompany it, a report on each area surveyed, in the form of advance sheets, bound in paper covers, of which five hundred copies shall be for the use of each Senator from the State, two thousand copies for the use of each Representative for the congressional district or districts in which the survey is made, and one thousand copies for the use of the Department of Agriculture.

Approved, March 14, 1904.

[On July 1, 1901, the Division of Soils was reorganized as the Bureau of Soils.]



Areas surveyed in Tennessee.

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U S DEPT. OF AGRICULTURE
BUREAU OF SOILS
MILTON WHITNEY, CHIEF
CURTIS F. MARBUT, IN CHARGE SOIL SURVEY

SOIL MAP
TENNESSEE
MEIGS COUNTY SHEET

TENNESSEE GEOLOGICAL SURVEY
WILBUR A. NELSON, STATE GEOLOGIST

85°00′ 55′ 50′ 45′ 84°40′
35°40′ 35′ 30′ 25′ 35°20′

Hardwick
Rowdens Store
Maple Grove Church
Euchee
Euchee School
Fochee
Pinhook
Collins School
Fellowship Church
Pleasant Hill School
Tenmile
Mt. Wesley Church
Concord Church
Woodys Mill
Peakland
Oak Grove Church
Oak Grove School
Rocky Springs Church
Mt. Zion Church
Center Point
Moores Chapel
Gettys Chapel
Gettys Mill
Ewing School
Forest Grove School
Iron Bridge School
Davis Academy
Stewarts Chapel
Breedenton (Stewarts Landing)
Stumptoe School
Walnut Grove School
Walnut Grove Church
Hunter Bluff
Concord School
Calico
Decatur
Union Grove School
Cottonport
Cottonport Church
Cottonport School
Goodfield
Goodfield Church
Bethesda Church
Pineland Church
Pleasant Hill School
Coffmans Store
Malones Store
Shiloh Church
Garrison Bluff
Jolly or Benham I.
Chattin Spring School
Goodhope Church
Burkett Church
Bigspring
Mt. Carmel Church
Center Point School
Gravel Hill School
Britts Ville
Pleasant Hill School
Clay Hill School
East View Church
Georgetown

RHEA CO.
MEIGS CO.
ROANE CO.
McMINN CO.
HAMILTON CO.
BRADLEY CO.
TENNESSEE RIVER
BOUNDARY LINE
TEN MILE RIDGE
NO. POND VALLEY
HURRICANE CREEK
RED CLOUD FERRY
MCEWEN FERRY
PINHOOK FERRY
SUEE LANDING
ENGLEROCK LANDING
HENRY FERRY
POWERS LANDING
ARMSTRONG FERRY
LOWER MOON LANDING
MOON LANDING
KINGSFIELD LANDING
BLYTHE FERRY
DOUGHTY FERRY
HIWASSEE
BUNKER HILL FERRY
McCLANAHAN LANDING
RUSSELL FERRY

LEGEND

Atkins silt loam — Al	Frederick gravelly loam — Fl
Colbert silt loam — Cl	Hagerstown gravelly loam — Hg
Colbert silty clay loam — Cs	Hagerstown silt loam — Hs
Decatur clay loam — Dl	Holston gravelly loam — Hl
Dekalb stony loam — Dm	Huntington silt loam — Hm
Dekalb silt loam — Ds	Montevallo silty clay loam — Ms
Elk silt loam — El	Waynesboro silt loam — Wl
Rough stony land — R	

CONVENTIONAL SIGNS

CULTURE
(Printed in black)

City or Village, Roads, Buildings, Wharves, Jetties, Breakwater, Levee, Lighthouse, Fort.
Secondary roads and Trails
Railroads Steam and Electric
Bridges, Ferry
R.R crossings, Tunnel
Ford, Dam
School or Church Cemeteries
Mine or Quarry Mine dumps Made land
Bluff, Escarpment, Rock outcrop, and Triangulation station
Stony and Gravelly areas
Soil boundaries
Boundary lines
Boundary lines
Boundary lines
U.S. township and section lines

RELIEF
(Printed in brown or black)

Contours Depression contours
Prominent Hills Mountain Peaks
Sand, Wash, and Sand dunes
Shore and Low-water line, Sandbar

DRAINAGE
(Printed in blue)

Streams
Lakes, Ponds, Intermittent lakes
Intermittent streams
Springs, Canals, and Ditches, Flumes
Swamp Salt marshes
Submerged marsh Tidal flats

The above signs are in current use on the soil maps. Variations from this usage appear in some maps of earlier dates.

W. Edward Hearn, Inspector, Southern Division
Soils surveyed by A.T. Sweet, in charge, and J.H. Agee.

1 ½ 0 1 2 3 4 Miles
Scale 1 inch = 1 mile

Allaun & Co. Lith. Baltimore, Md.

Field Operations
Bureau of Soils
1919